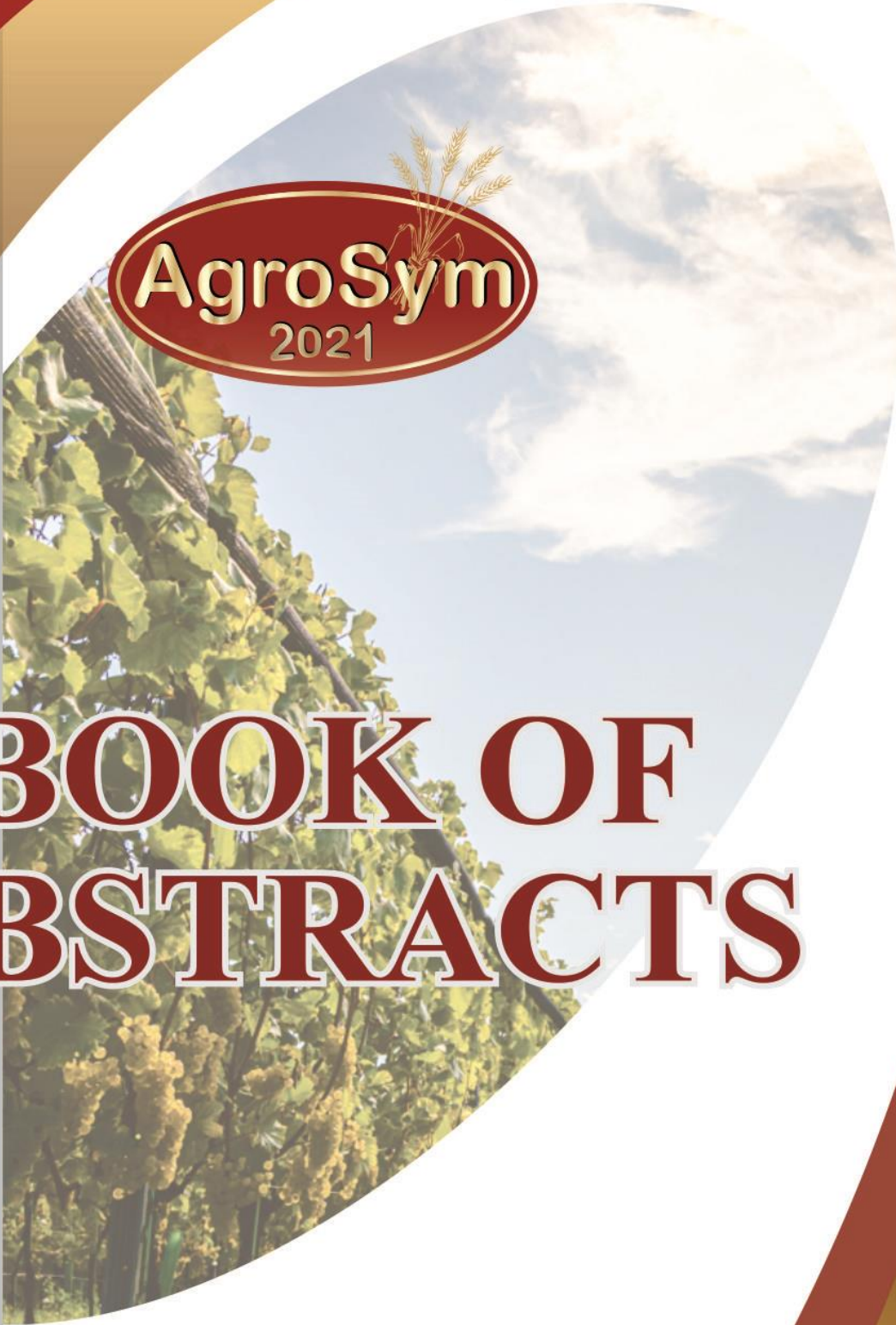




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BOOK OF ABSTRACTS

*XII International Scientific
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COULD CARBON DOTS ALLEVIATE COPPER TOXICITY IN MAIZE?

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Abstract

Copper (Cu) is an essential microelement in various processes in the cell wall, such as wall synthesis and loosening, but Cu excess due to human activities increase soil pollution and can induce harmful effects. Alleviation of Cu toxicity could be ameliorated in various ways such as adding organic compounds and cations (Ca²⁺, Mg²⁺). This study aimed to reduce Cu toxic effects using organic nanoparticles as potential nano-fertilizers obtained from folic acid. Carbon dots (CDs) are biocompatible and non-toxic nanoparticles with chemical affinity to some heavy metals. In this research, CDs were applied in two different concentrations - 167 mg/L and 500 mg/L with or without 5 μM Cu²⁺ during the growth of maize plants in hydroponic solution. Cu concentration in plants and parameters of secondary metabolism - total phenolic content (TPC) and total antioxidative activity (TAA) were measured. Results showed that CDs based on folic acid were transported through maize and were present in both roots and leaves after 7 day-treatment. Cu concentration in roots was higher in both Cu and Cu/500CDs treatments compared to the control. The application of CDs reduced Cu concentration at the root level, while no significant effect was observed in leaves. However, the application of CDs was not effective in the mitigation of the oxidative stress in both roots and leaves induced by excess Cu. CDs neither affected TPC and not alleviated the TPC increase caused by Cu. Also, CDs did not cancel the TAA increase induced by Cu in any of the applied concentrations. In the leaves, TAA increased in all treatments where Cu was present in the growth medium. There were no visual adverse effects on plants.

Keywords: *carbon dots, copper, maize, nanoparticles, toxicity.*